[LONG MASTER RESUME]
James M. Irving, Ph.D.

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SUMMARY V1

Innovative and enterprising data scientist with extensive experience in applying advanced data science techniques to real-world problems. Known for excellent problem-solving skills and the ability to rapidly master and implement new technologies. Committed to leveraging data to drive innovation and support data-driven decision-making.

SUMMARY V2

Neuroscientist-turned-data scientist with an insatiable curiosity and a proven track record in mastering cutting-edge technologies. Exceptional communication and interpersonal skills paired with a robust history of problem-solving and critical thinking. Proven ability to self-teach complex concepts and technologies, including in vivo electrophysiology recordings and analysis. Successfully trained generations of collaborators, technicians, research fellows, and undergraduate volunteers by customizing the training to match the specific trainee's experience and knowledge.

COMPETENCIES

- Data Analysis, Statistical Modeling, Machine Learning, Data Visualization
- Experimental Design, Quantitative Research Methods, Time Series Analysis, Signal Processing
- Cognitive Neuroscience, Behavioral Analysis, Database Management, Pattern Recognition
- Python Programming, Deep Learning, Natural Language Processing, AI/LLM Implementation
- Adaptive Communication Style, Problem-Solving & Critical Thinking

EXPERIENCE

Coding Dojo | Remote

Curriculum Writer - Data Science
March 2023 - January 2024

- Developed and delivered advanced courses in Time Series Modeling, NLP, and Model Deployment, enhancing data science skills for over 100 professionals.
- Expanded a 16-week boot camp to a 24-week comprehensive training program, increasing curriculum depth by 50%, which boosted learner engagement and program satisfaction.
- ~~Implemented project management and automation tools using Monday.com, optimizing workflow efficiency and resolving operational bottlenecks.~~
- Developed and implemented Monday.com boards, including public forms and executive-facing Gantt charts, to automate internal workflows and streamline curriculum management, resolving over 100 issues.
- Integrated cutting-edge technologies like APIs, Web Scraping, and Computer Vision into the curriculum, aligning educational content with evolving industry standards and practical application needs.
- Developed a workflow and process to test and identify datasets for curriculum use, including template Python notebooks for preprocessing, visualization, EDA, modeling, and interpretations.
- Constructed the Dojo Environment Setup for Students, ensuring compatibility with various OS and facilitating smooth installation of necessary tools and libraries.
- Created and maintained a GitHub Organization for curriculum-related activities, solutions, and packages, providing a centralized resource hub for students and instructors.
- Designed an extended case study for the 6-month curriculum, applying all phases of CRISP-DM to a specially constructed subset of the Ames housing dataset, enhancing practical application and understanding of the data science lifecycle.
- Achieved tight deadlines throughout the year despite unexpected demands related to getting the curriculum accredited ensuring timely delivery and high-quality content for the program.

Data Science Instructor
November 2021 - March 2023

- Achieved high Net Promoter Scores (NPS) exceeding 90% through engaging and interactive live lectures, demonstrating strong communication and pedagogical skills.
- Revolutionized administrative workflow by automating tasks, resulting in a 99% reduction in student onboarding time—from 5 hours to just 2 minutes—dramatically enhancing operational efficiency and productivity.

- Developed and delivered a highly acclaimed 4-week course with perfect feedback ratings, showcasing expertise in curriculum development and instructional delivery.
- Designed and led over 16 interactive live lectures and code-along projects, enhancing student participation and creating a dynamic learning environment.

Flatiron School | Remote

Data Science Instructor
October 2019 - October 2021

- Mentored and supervised over 60 students, helping them transition into successful data science careers with a high post-program employment rate.
- Conducted weekly 90-minute study groups, accumulating over 270 hours of recorded lessons, significantly enhancing student comprehension and engagement.
- Spearheaded the development and implementation of the "Flex" boot camp program, refining instructional design and delivery methods to meet diverse learning needs.
- Created and maintained three student-progress-tracking Looker dashboards, providing real-time insights into student performance and facilitating timely interventions.
- Guided students in selecting capstone project subjects, identifying job sectors of interest, and selecting appropriate data sources. Topics included time series analysis, NLP analysis, Covid cough classification (via Computer Vision), and customer segmentation.
- Offered bonus lectures on Object-Oriented Programming, dashboarding with Plotly and Dash, and advanced visualizations with matplotlib and seaborn.
- Updated the entire lecture and activity content to accommodate a new teaching model, integrating recorded lectures from a national "Central Lecturer" with expanded hands-on activities.

University of Maryland, School of Medicine | Baltimore, MD

Laboratory Manager
July 2017 - August 2018

- Ensured full compliance with regulatory standards as the lab's public representative, achieving a flawless inspection record.
- Successfully represented lab and guided inspectors through 4 regulatory inspections from 2 agencies, demonstrating knowledge of and compliance with protocols and regulations.
- Negotiated and finalized a $100,000 technical hardware contract with vendors, optimizing procurement processes and ensuring cost-effectiveness.
- Managed and administered over 20 TBs of data storage systems, ensuring data accessibility, security, and efficient retrieval.
- Overhauled mouse colony management procedures, reducing housing costs by 60% (from approximately $3.8k/month to $1.5k/month) through strategic resource allocation and process optimization.
- Created and instituted new surgery logs to simplify record keeping while ensuring regularity compliance.
- Managed lab supplies and equipment purchasing, maintaining appropriate documentation and financial records.
- Consolidated and encrypted all sensitive and proprietary lab information vendor accounts, log-in information, and secure information into an encrypted data vault

Postdoctoral Research Fellow
June 2015 - July 2017

- Led neuroscience research using advanced techniques such as in vivo optogenetics and electrophysiology recordings, resulting in groundbreaking insights into neural functioning.
- Developed approximately 30 custom analysis scripts in Matlab, NexScript, MedPC, and Arduino, enhancing data processing capabilities and facilitating comprehensive statistical analyses.
- Mentored and guided a diverse team, fostering a collaborative learning environment and achieving research excellence (1 postdoc, 2 Ph.D. students, 3 lab techs, and 3 undergraduate volunteers.)
- Demonstrated self-directed learning by mastering Matlab programming and creating custom-designed analysis programs for large datasets, streamlining data interpretation and enhancing research efficiency.
- Researched the role of extended amygdala stress neurons in binge drinking, using multiple genetic tools and in vivo electrophysiology recordings.
- Recorded changes in the activity of amygdala neurons during binge drinking. Identified neuron populations using a combination of single-unit recordings and optogenetic stimulation using targeted viral vectors.
- Founded in vivo electrophysiology recordings and in vivo deep-brain structure calcium imaging in awake and behaving mice.
- Directed several research projects simultaneously and managed a staff of postdoctoral fellows, technicians and student volunteers.
- Programmed custom-designed analysis programs (~30) for large datasets in 4 programming languages (see skills).
- Communicated research findings to mixed audiences with varying degrees of background knowledge and experience via seminars, presentations, as well as scientific posters.
- Wrote user guides on various complicated technical procedures and techniques to train lab members and collaborators.
- Trained and mentored 1 research fellow, 2 graduate students, 2 lab technicians, and 3 undergraduate volunteers on several complex technical procedures and the underlying scientific principles/theory.

Graduate Research Assistant

September 2009 - May 2015
- Pioneered application of optogenetics with fast-scan cyclic voltammetry to discover previously unknown modulation of dopamine release via cholinergic interneurons.
- Communicated research findings to audiences with varying degrees of background knowledge and familiarity in seminars, as well as scientific posters.
- Trained and mentored 4 fellows, 3 graduate students, 5 lab technicians, 6 collaborators, and 1 undergraduate volunteer on various complex procedures and techniques.
- Wrote user guides on various complex technical procedures and techniques to train current and future lab members

Tulane University | New Orleans, LA
Research Assistant
January 2009 – May 2009
- Continued master's thesis study of the role of histone deacetylase (HDAC) inhibition in aggression under chronic stress.
- Tested changes in stress hormones and protein expression in stressed rats with HDAC inhibition.

DISTINCTIONS & HONORS

Happy Camper Award, University of Maryland
2012 – 2013
- Awarded to the Ph.D. student with the most positive attitude in the face of adversity, as voted by fellow students.

Summer Research Program Award, Tulane University
May 2008 to August 2008
- Awarded for distinguished scientific research, including salary.

Tulane Distinguished Scholars, Tulane University
Fall 2004 - Fall 2007
- Awarded for outstanding academic performance.

Tulane-Newcomb College Dean's List
Fall 2004 - Fall 2005
- Awarded for achieving a GPA greater than 3.7

EDUCATION

Certificate of Completion, Data Science, Flatiron School, Online (February 2019 - August 2019)
- Intensive 5-month program, approximately 50 hours per week

Doctor of Philosophy, Neuroscience, University of Maryland, Baltimore, MD (August 2009 - May 2015)
- Including specialized optional training: Entrepreneurship in Life Sciences course, Science Communication internship.

Master of Science, Neuroscience, Tulane University, New Orleans, LA (January 2008 - December 2008**)**

Bachelor of Science, Neuroscience (Sociology Minor), Tulane University, New Orleans, LA (August 2004 - December 2007**)**

ADDITIONAL EXPERIENCE AND SERVICE

University of Maryland | Baltimore, MD
Science Communication Internship – Office of Public Affairs
June 2013 - September 2013
- Selected as one of four founding members for an internship with Office of Public Affairs at the University of Maryland School of Medicine.
- Trained in many aspects of university public affairs communications, relaying complex scientific material to a lay audience for both educational and promotional purposes.
- Wrote press releases on university-associated research and novel findings to disseminate to inspire media coverage.
- Wrote an in-depth interview featuring a university scientist's high-impact research developing a novel anti-depressant.
- Practiced live television interviews in the university's satellite teleconferencing suite as both interviewer and interviewee.
- Weekly training classes + independent assignments – 5-10 hours/week.

Entrepreneurship in Life Sciences – Interdisciplinary Course
January 2014 to June 2014
- Trained by visiting experts in aspects of developing, promoting, and acquiring venture funding for a biomedical technology company.

- Wrote and presented funding proposals for venture capitalist firms for a resource-sharing/saving cloud-based software solution for universities.
- Wrote a business plan, patent applications, and promotional materials.
- Weekly classes + group work – 10 hours/week.

Student Training Committee Member
January 2013 - June 2015
- Served graduate student community as proponent and liaison to the Ph.D. program administration.
- Reformed graduate program policies and procedures for the mutual benefit of students and faculty.
- Advised administration on student outreach and prospective student application/interview process.

Big Brother – Program in Neuroscience
August 2010 - December 2013
- Volunteered as "Big Brother" mentor for 3 incoming doctoral students.
- Advised "little brothers" on research lab choices, handling graduate coursework, and navigating university politics.

Tulane University | New Orleans, LA

Green Wave Ambassador
Fall 2004 – Spring 2005
- Led guided tours of the campus for prospective students and their families, providing comprehensive information about academic programs, campus facilities, and student life.
- Served as a host for visiting students, organizing and facilitating events to enhance their campus experience.
- Engaged with visitors to answer questions, provide insights into the student experience, and assist with logistical needs.
- Represented the university positively, contributing to recruitment and outreach efforts by sharing personal experiences and highlighting unique aspects of the campus community.

Student Calling Center Representative
Fall 2005 – Spring 2007
- Contacted alumni to provide updates about university events, achievements, and developments.
- Engaged alumni in meaningful conversations to foster a connection between them and the university.
- Solicited donations, explaining the impact of their contributions on university programs, scholarships, and facilities.
- Maintained accurate records of interactions and feedback, contributing to the continuous improvement of alumni relations and fundraising strategies.

PUBLICATIONS

- Aroni S, Marino RAM, Girven KS, **Irving JM**, Cheer JF, Sparta DR. (2021) *Repeated binge ethanol drinking enhances electrical activity of central amygdala corticotropin releasing factor neurons in vivo.* Neuropharmacology.
- Girven, K., **Irving, J.**, Aroni, S., Sparta, D. The Role of Interconnections between the vBNST and insula in the *modulation of reward processing.* Manuscript in preparation.
- Cachope, R., Mateo, Y., Mathur, B.N., **Irving, J.**, Wang, H.-L., Morales, M., Lovinger, D.M., and Cheer, J.F. (2012). *Selective Activation of Cholinergic Interneurons Enhances Accumbal Phasic Dopamine Release: Setting the Tone for Reward Processing.* Cell Reports *2*, 33–41.
- Mateo, Y., Atwood, B., Wang, H.-L., Zhang, S., **Irving, J.**, Gildish, I., Cachope, R., Bellochio, L., Guzman, M., Morales, M., Cheer, J.F., and Lovinger, D.M. *Cortical afferents expressing CB1 receptors control accumbal phasic dopamine release caused by selective activation of cholinergic interneurons.* Manuscript submitted for publication.

POSTER ABTRACTS

- **Irving, J.M.**, Maehler, C.J., Qadir, H., Girven, K.S., Sparta, D.R. *Central Amygdala Corticotropin Releasing FactorNeurons Encode and Modulate Binge Drinking and Relapse* American College of Neuropsychopharmacology Annual Meeting 2016.
- I**rving, J.M.**, Maehler, C.J., Girven, K.S., Sparta, D.R. *The Role of Extended Amygdala Corticotropin Neurons in Binge Ethanol Drinking.* Society for Neuroscience Annual Meeting 2016.
- **Irving, J.M.**, Maehler, C.J., Sparta, D.R. *Optogenetic and Pharmacogenetic Interrogation of Central Amygdala Corticotropin Neurons on Binge Ethanol Drinking.* Research Society on Alcoholism Annual Meeting 2016.
- **Irving, J.M.,** Gluskin, K.H., Cheer, J.F. *Optogenetic activation of accumbal fast-spiking interneurons is reinforcing.* Society for Neuroscience Annual Meeting 2014.
- Kashtelyan, V., **Irving, J.M.,** Fitoussi, A., Wang, H., Morales, M., Cheer, J.F. *Conditional deletion of CB1 receptors on cholinergic terminals and its functional consequences.* Society for Neuroscience Meeting Annual 2014.
- **Irving, J.M.**, Mateo, Y., Cheer, J.F. *Optogenetic Stimulation of Cholinergic Interneurons in the Nucleus Accumbens Causes Dopamine Release.* Society for Neuroscience Meeting 2011.

- **Irving, J.M.**, Mateo, Y., Cheer, J.F. *Endogenous Activity of Cholinergic Interneurons in the Nucleus Accumbens is Sufficient to Evoke Dopamine Release*. Graduate Research Conference 2012.

PROFERRED COMMUNICATIONS

- **Irving, J.M**., Sparta, D.R. *"Modulation of Binge Drinking by Central Amygdala Corticotropin-Releasing Factor Neurons."* Department of Anatomy & Neurobiology, Second-Monday Program, University of Maryland School of Medicine, 2016.
- **Irving, J.M.**, Cheer, J.F. *"The Role of Local Activity of the Nucleus Accumbens in Reward: Interneurons and Gamma Oscillations,"*, Public Dissertation Defense, 2016.
- **Irving, J.M.**.Cheer, J.F., *"Selective activation of cholinergic interneurons enhances accumbal phasic dopamine release: setting the tone for reward processing."*, Department of Anatomy & Neurobiology, Second-Monday Program, University of Maryland, Baltimore, 2012.
- **Irving, J.M.**.Cheer, J.F., "*Selective activation of cholinergic interneurons enhances accumbal phasic dopamine release: setting the tone for reward processing.*", Program in Neuroscience Retreat, Notre Dame of Maryland, 2012.
- **Irving, J.M.**, Cheer, J.F., *"The Role of CB1 Receptors on GABAergic Interneurons of the Nucleus Accumbens in Motivated-Behavior and Modulation of Accumbal Gamma Rhythms"* University of Maryland, Baltimore, Thesis Proposal, 2014.
- **Irving. J.M.**, Cheer, J.F., *"The Reinforcing Effects of Gamma-Frequency Stimulation of Accumbal Parvalbumin Interneurons and the Role of CB1 Receptors"*, University of Pittsburgh, Department of Psychiatry, 2015.

DATA SCIENCE PROJECTS

Computer Vision Classification of American Sign Language – GitHub Link
Applied tensorflow and transfer learning to classify an image as the correct letter of the ASL alphabet.
- COMING SOON

AI Job Application Assistant – App Link – GitHub Link
Developed a Streamlit application to assist job seekers with resumes and cover letters
- Developed a Streamlit application to assist job seekers by analyzing resumes and job listings using AI.
- Integrated ChatGPT for tailored advice, resume improvements, and cover letter creation.
- Automated job application process with AI-driven insights and recommendations.
- Enhanced user experience with an interactive and user-friendly interface.
- Provided actionable advice to job seekers, improving their chances of success.
- Key Technologies Used: Streamlit, LangChain, OpenAI API

NLP Analysis of Amazon Reviews + AI Recommendations - GitHub Link
Natural Language Processing Analysis, Modeling, and Deployment with Actionable Insights
- Designed and deployed a user-centric Streamlit dashboard, integrating live sentiment predictions and interactive analysis of trends to guide strategic decision-making.
- Conducted sentiment analysis on over 5 million Amazon Grocery & Gourmet Food reviews, utilizing NLP and machine learning techniques (Logistic Regression, Tf-idf vectorization) to identify key factors affecting customer satisfaction and achieve 95% accuracy in sentiment classification.
- Employed Hugging Face transformers and Lang Chain/ChatGPT within the dashboard with a vectorized database used for summarization and insights, translating vast consumer feedback into actionable product enhancement strategies.
- Key Technologies Used: Python, Hugging Face, OpenAI API, LangChain, spacy, scikit-learn.

How to Make a Successful Movie – GitHub Link

Constructing and analyzing an extensive movie database with hypothesis-testing insights + Tableau Dashboard
- Integrated and normalized datasets from IMDB and TMDB API for comprehensive movie analysis.
- Engineered a MySQL database on AWS RDS for robust data storage and retrieval.
- Designed an interactive Tableau dashboard to communicate findings to stakeholders, enhancing decision-making processes (see GitHub link).
- Applied A/B Testing to identify key factors influencing movie performance and success to provide business recommendations on what movies to create for high box office returns on factors like MPAA rating, runtime, and genre.
- Key Technologies Used: Python, SQL, Tableau, TMDB API, Pandas, sqlalchemy, MySQL Workbench, statsmodels, AWS RDS

How to Spot a Troll – GitHub Link
Classifying Russian Troll Tweets vs Authentic Tweets
- Performed EDA on 3 million tweets from accounts from the Internet Research Agency (the Russian Troll Farm) to identify an appropriate control dataset (which time period and content to extract to construct control group).
- Harvested control tweets for use in supervised learning using the TwitterAPI and TweetDeck to target the top 40 most frequent mentions, which produced 40,000 control tweets.
- Conducted natural language processing (NLP) on 80,000 tweets using nltk, Word2Vec, and Keras to tokenize, vectorize, and train word embeddings for Logistic Regression and multiple Keras Neural Networks.
- Final models achieved 90% accuracy with a dense neural network (training time: 32 sec) and 88% accuracy using Logistic Regression (training time: 0.6 sec)
- Key Technologies Used: Python, Tweepy, Neural Networks (Tensorflow & Keras),

Recidivism Risk Assessment – GitHub Link

Classifying which released prisoners in Iowa will return to a life of crime using Next-Gen Gradient Boosted Trees

- Developed a predictive model to classify which released prisoners in Iowa are likely to return to crime using Gradient Boosted Trees. with over 70% accuracy (via scikit-learn and Catboost).
- Researched Iowa's state sentencing guidelines and sentencing enhancements to engineer new numerical features to capture the severity of the crimes committed and the duration of sentences.
- Achieved high recall rates for predicting recidivism using XGBoost.
- Identified key features influencing recidivism, such as age, release type, and offense subtype.
- Provided actionable insights and recommendations to the Iowa Department of Corrections.
- Implemented various machine learning models and utilized SHAP for feature importance analysis.
- Key Technologies: Python, Jupyter Notebooks, XGBoost, CatBoost, SHAP, SMOTE

Forecasting Stock Market Fluctuations with Trump's Tweets – *GitHub Link*

Combining Natural Language Processing of Trump's Tweets with Time Series Forecasting S&P500 Price

- Employed Natural Language Processing with nltk and word embeddings (both Word2Vec & GloVe pre-trained) to classify Trump's tweets by S&P 500 price change (increase/decrease/no change) 60 minutes after tweeting.
- Compared tweet NLP classification models using Keras neural networks (LSTM, GRU, and CNN) to predict the direction of stock market price change from NLP alone.
- Used Keras neural networks for time series forecasting of S&P 500 price.
- Compared multiple data sources: price alone, price + 7 market technical indicators.
- Compared forecasting models: Keras LSTM vs. XGBoost Regressor.
- Final model stacked NLP classification predictions with S&P 500 time series forecasting and additional tweet features (sentiment analysis with Vader, number of retweets/favorites, uppercase-to-lowercase ratio).

PROFESSIONAL SKILLS

Programming: Python, OOP, SQL (MySQL, SQLAlchemy), MATLAB, HTML/CSS, Git/GitHub, NexScript, MedState Notation

Data Analysis: ETL (numpy, pandas), AB Testing (scipy, statsmodels), Machine Learning (scikit-learn, Catboost, XGBoost), Deep Learning (Tensorflow, Keras)

Natural Language Processing: nltk, spaCy, Tensorflow, HuggingFace transformers, LLMs(OpenAI, LangChain)

Visualization/Dashboarding: Plotly/Dash, Tableau, Streamlit Dashboards & Deployment, Seaborn/Matplotlib, Looker

Software: Adobe Illustrator, Adobe Photoshop, GraphPad Prism, SPSS, Microsoft Office, VS Code, Jupyter Notebook/Lab, Google Suite, Plexon OfflineSorter, NeuroExplorer

LEADERSHIP & COMMUNITY INVOLVEMENT

SECTION IS WORK-IN-PROGRESS

- **Key Club Lt. Governor**